

Exercise 2.3

- Q1 Find the probabilities below.
Give your answers to 3 significant figures.
- a) For $X \sim B(10, 0.14)$:
- (i) $P(X = 2)$ (ii) $P(X = 4)$ (iii) $P(X = 5)$
- b) For $X \sim B(8, 0.27)$:
- (i) $P(X = 3)$ (ii) $P(X = 5)$ (iii) $P(X = 7)$
- Q2 Find the probabilities below.
Give your answers to 3 significant figures.
- a) For $X \sim B(20, 0.16)$:
- (i) $P(X < 2)$ (ii) $P(X \leq 3)$ (iii) $P(1 < X \leq 4)$
- b) For $X \sim B(30, 0.88)$:
- (i) $P(X > 28)$ (ii) $P(25 < X < 28)$ (iii) $P(X \geq 27)$
- Q3 Find the probabilities below.
Give your answers to 3 significant figures.
- a) For $X \sim B(5, \frac{1}{2})$:
- (i) $P(X \leq 4)$ (ii) $P(X > 1)$ (iii) $P(1 \leq X \leq 4)$
- b) For $X \sim B(8, \frac{2}{3})$:
- (i) $P(X < 7)$ (ii) $P(X \geq 2)$ (iii) $P(0 \leq X \leq 8)$
- Q4 A fair, six-sided dice is rolled 5 times.
What is the probability of rolling exactly 2 sixes?
- Q5 A multiple-choice test has three possible answers to each question, only one of which is correct. A student guesses the answer to each of the twelve questions at random. The random variable X is the number of correct answers.
- a) State the distribution of X and explain why this model is suitable.
- b) Find the probability that the student gets fewer than three questions correct.
- Q6 5% of the items made using a particular production process are defective. A quality control manager samples 15 items at random. What is the probability that there are between 1 and 3 defective items (inclusive)?
- Q7 For each dart thrown by a darts player, the probability that it scores 'treble-20' is 0.75.
- a) The player throws 3 darts.
Find the probability that he gets a 'treble-20' with at least 2 darts.
- b) He throws another 30 darts for a charity challenge. If he gets a 'treble-20' with at least 26 of the darts, he wins the charity a prize. What is the probability that he wins the prize?



Exercise 3.1

Q1-4 Hint: Like the example above, it's a lot quicker to do these questions by generating a table on your calculator (if you can).

Q1 The random variable $X \sim B(10, 0.25)$.

Use your calculator to find:

- a) $P(X \leq 2)$ b) $P(X \leq 6)$ c) $P(X \leq 9)$
d) $P(X < 5)$ e) $P(X < 4)$ f) $P(X < 6)$

Q2 The random variable $X \sim B(15, 0.4)$. Find:

- a) $P(X > 3)$ b) $P(X > 6)$ c) $P(X > 10)$
d) $P(X \geq 5)$ e) $P(X \geq 3)$ f) $P(X \geq 13)$

Q3 The random variable $X \sim B(20, 0.35)$. Find:

- a) $P(X = 7)$ b) $P(X = 12)$ c) $P(2 < X \leq 4)$
d) $P(10 < X \leq 15)$ e) $P(7 \leq X \leq 10)$ f) $P(3 \leq X < 11)$

Q4 The random variable $X \sim B(25, 0.8)$. Find:

- a) $P(X \geq 17)$ b) $P(X \geq 20)$ c) $P(X > 14)$
d) $P(X = 21)$ e) $P(14 \leq X < 17)$ f) $P(12 < X \leq 18)$

Q5 The probability of having green eyes is known to be 0.18. In a class of thirty children, find the probability that fewer than ten children have green eyes.



Q6 In a production process it is known that approximately 5% of items are faulty. In a random sample of 25 objects, estimate the probability that fewer than 6 are faulty.

